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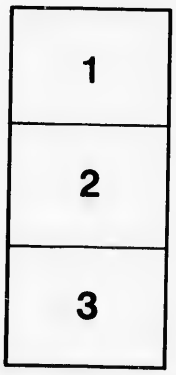

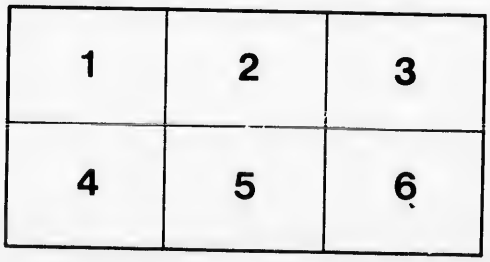

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IV.—*Two Species of Trees from the Post-Glacial of Illinois.*

By D. P. PENHALLOW, B.Sc.

(Read May 27, 1891.)

Last year Prof. O. Marcy, of Evanston, Illinois, transmitted to me two specimens of fossil wood for determination. One was obviously an oak and the other a coniferous wood of some kind, which Prof. Marcy thought possibly might be a *Thuya*. Both were in such a state of preservation as to admit of treatment with caustic potash, and the subsequent preparation of sections with an ordinary microtome. The sections showed the structure to be on the whole well preserved, though in the oak, somewhat modified by decay and pressure.

GEOLOGICAL POSITION.

From the data furnished by Prof. Marcy, I am able to make the following statement respecting the geological position of these plants :—

As appears from the accompanying map,[1] three lake ridges are prominently developed in the immediate neighborhood of Chicago. Two of these, the middle and lower

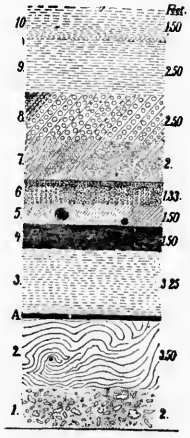

FIG. 1.

beaches, have their western terminations on the shores of the present lake at Evanston, where the water has so encroached upon them as to make a cutting, exposing the ridges in section. The relations of the various deposits thus brought to view are exhibited in the sectional figure (fig. 1).

[1] Plate III.

From this it appears that the boulder clay is found at about the present level of the lake. Immediately above the boulder clay is a thin layer of soil (A), in which the coniferous wood was found. Following this are 3.25 feet of gravel and 1.5 feet of peat, containing shells. The peat is covered by 1.5 feet of fine sand, in which the oak was imbedded. The peat (No. 4) includes at the top, shell marl. The shells embrace such forms as those of *Planorbis*, *Limnea*, etc., in all, nine different genera, which Stimpson pronounces to be of existing species. The local evidence is such as to confirm the view that the *Picea* grew upon the spot where found, sending its roots down into the clay.

The cross section (fig. 2) supplied to Prof. Marcy by Dr. E Andrews, shows the position (S) of the layer of peat, corresponding to No. 4 of figure 1.

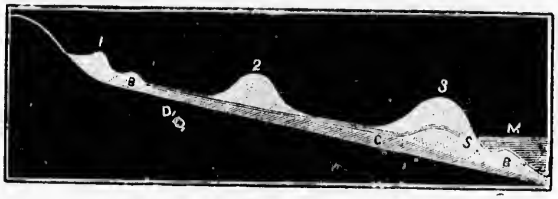

Fig. 2.

Figure 1 is a section of the lower beach at the point where it is cut by the lake, and about six years ago, bones of the mastodon were found *in* or *on* the layer of peat (No. 4) thus exposed.

Prof. Marcy expresses the view, based upon Spencer on the Iroquois Lake,[1] that at the time the *Picea* grew, the waters of the lake were as low as, or lower than now. The waters afterwards rose and formed the upper beach, then the middle, and finally, the lower beach, which is still in process of formation. At the high level, there was a bay covering Chicago, and an outlet through Lemont. From these data it would appear that the formation is a recent one, and Sir Wm. Dawson seems inclined to consider it as early post-glacial.

Descriptions of the Woods.

Quercus.—The oak is sufficiently well preserved to render good transverse and longitudinal sections possible, after treatment with caustic potash. In the transverse section only the general structural features can be made out, with the exception of the thyloses, which are very clearly defined. The wood cells have been so far brought under the operations of decay, as to render it impossible to make out their detailed characters. The same cause, of course, has equally affected the structure as exposed in longitudinal sections; so much so that it was not possible to obtain satisfactory drawings of the various structural features. Here and there these were made out with sufficient distinctness to serve as the basis of the description given.

By comparison with recent species of *Quercus*, this fossil appears to most nearly approach *Q. prinus* and *Q. garryana*, the affinities being nearer the former than the latter. Such differences as could be definitely established, were found in the length of the ray

[1] 'Amer. Jnl. Sc.' xl, 447.

cells, the abundance and form of the markings on the vessels, and the number and size of the medullary rays. These differences are such as to render exact identification with modern species hardly probable, and as a suitable means of distinction and recognition I would therefore propose for this fossil the name of *Quercus marcyana*.

Picea.—The wood of the *Picea* was cut with as great facility as the oak, and while the transverse sections were quite clear as to the details of structure, the longitudinal sections also gave numerous well preserved details, from which a series of drawings (plate II) were prepared.

So far as the details have been made out, they seem to establish affinity with *Picea sitchensis*, but as in the case of the *Quercus*, the differences are such as to cause hesitation in establishing exact identity between them. Were it possible to establish identity between the two, then there would be good evidence to show the extent to which the area of distribution of *Picea sitchensis* has contracted within recent geological time, since this species is now essentially confined to the Pacific coast, from Alaska to Mendocino, California, extending inland not more than fifty miles. I deem it expedient to distinguish this fossil by a separate name, for which I would suggest *Picea evanstoni*.

Quercus marcyana, n. sp.

Transverse section. Growth rings defined only by apposition of wood and vessels. No obvious distinction of spring and autumn wood. Wood cells irregularly disposed, the largest about 0.04 mm. in diameter.

Vessels numerous and large, measuring about 0.20 × 0.30 mm. compressed tangentially, chiefly in zones, alternating with zones of wood of about the same width. Thyloses conspicuous. The larger medullary rays are about 0.24 mm. broad, and usually separated by about twenty narrow rays of one cell in width.

Radial section. Markings of the vessels obscure, owing to the operation of decay.

Thyloses conspicuous and abundant, and showing few round pits.

Medullary rays well developed; cells short, usually once or twice as long as broad; walls rather thick and irregular, with numerous small channels; ends square or somewhat oblique. Perforations on the radial walls round, conspicuous and somewhat numerous.

Tangential section. Thyloses conspicuous, the markings numerous and composed of narrow slits. Markings on the walls of the vessels somewhat conspicuous and composed of linear or narrowly elliptical slits.

The smaller rays usually one row of cells wide, few to many cells high. The larger rays are many cells broad and very high.

Picea evanstoni, n. sp.

Plates II and III.

Annual rings well defined; tracheids of the autumn wood rather thick walled, of the spring wood thin walled, with a single row of unequally disposed bordered pits.

Medullary rays from two to twenty cells high, usually of one row, or occasionally of three rows of cells at the centre. Resin tubes conspicuous in the autumn wood, but not numerous.

Transverse section Annual ring well defined, the autumn wood about equal to the spring wood. Cells disposed in radial rows, usually about five rows between the medullary rays. Rays somewhat abundant and narrow. The resin passages are not large—55.7 – 103 8 μ in diameter,—conspicuous and located wholly in the autumn wood, chiefly forming a row on its inner face. Many annual rings wholly destitute of resin passages.

Radial section. The thick walled tracheids of the autumn wood provided with a single row of bordered pits, somewhat irregularly disposed, the outer ring 6.9 – 13.8 μ in diameter. The thin walled tracheids of the spring wood with bordered pits in a single row and often scattering, the outer ring 6.9 – 17.3 μ in diameter. The medullary rays somewhat abundant, the cells rather long and thin walled, and showing pits.

Tangential section. The medullary rays usually composed of a single series of cells, sometimes showing two or three rows at the centre; usually from two to twenty cells high. No pits in the tangential walls.

EXPLANATION OF PLATES.

PLATE II.

Picea canadensis.

1.—Transverse section showing demarcation of growth ring, and a medullary ray. × 290.
2.—Tracheids showing bordered pits (*a*) of the spring wood, and (*b*) of the autumn wood. × 300.
3.—Medullary ray passing through the spring wood, showing structure and pits on radial walls. × 290.
4.—Medullary ray passing through the autumn wood, showing pits on radial walls. × 300.
5.—Tangential section of medullary rays of the ordinary form. × 290.
6.—Tangential section of one of the broad medullary rays. × 266.

PLATE III.

Map showing lake ridges in vicinity of Chicago.